



Greensource air to air heat pump



Worcester and you. Making a difference.

As part of the Bosch Group, Worcester products are designed and manufactured to provide customers with the highest levels of quality and reliability which are synonymous with the Bosch name throughout the world.

As part of Europe's largest supplier of heating products, Worcester, Bosch Group has the UK-based resources and support capability to offer you the value-added solutions needed to drive your business forward. Worcester employs a nationwide network of Service Engineers and technically trained Field Sales Managers supported by

an experienced award-winning technical services team which is able to provide comprehensive support and advice from designing system layouts through to installation.

Worcester is dedicated to providing energy efficient gas- and oil-fired condensing boilers, as well as an extensive range of renewable technologies. All of our products have been developed and introduced with the aim of reducing climate change, helping the UK to achieve the Government's efficiency targets.



BOSCH
Invented for life



The reception and main entrance
at our Worcester headquarters

“At Worcester we recognise the vital role you play in the specification and installation of energy efficient appliances in homes across the UK. We will continue to invest in our products, people, facilities and support services to ensure you can continue to deliver only the best solutions to your customers’ requirements.”

Carl Arntzen,
Managing Director,
Bosch Thermotechnology Ltd.

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The Greensource air to air heat pump

Global responsibility for nature and the environment

As a part of the Bosch Group, Worcester is committed to environmental protection. Product development is prioritised in the interests of peoples' safety, the economical use of resources and environmental sustainability.

With this in mind, Worcester is proud to offer the Greensource air to air heat pump, which uses a sustainable energy source to provide efficient heating comfort.

The new Worcester air to air heat pump has an updated internal and external unit. Both have been designed with the consumer and installer in mind, allowing Worcester to offer a high efficiency solution in a simple-to-install package.

Wide variety of applications

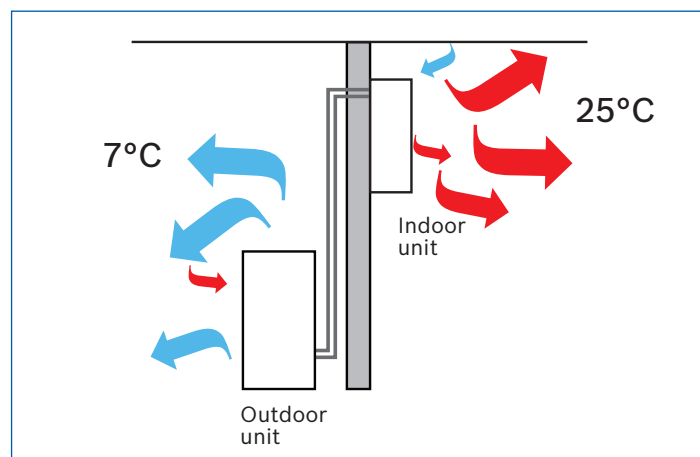
Our air to air heat pump not only allows consumers to efficiently heat their homes, but it also offers a cooling feature. The Worcester Greensource air to air heat pump is suitable for a wide variety of property types and sizes, and can complement existing gas, oil or renewable hot water systems. It can also offer stand-alone heating for the home in certain applications.

Worcester's Design Service can assist you in the specification of your design, including heat loss calculations.

Year round efficiency

A Worcester air to air heat pump is an all-in-one heating and cooling system that is designed to provide year-round comfort in the UK climate. The air to air heat pump has the ability to produce hot air comfort from as low as -20°C . For example, with an outside temperature of 7°C the Worcester Greensource air to air heat pump could produce an inside temperature of 25°C .

For every single kW of energy the unit consumes, it could produce up to 5 times more heat in return.



Typical temperatures in heating mode

Easy to install

The air to air unit has also been created with a simple cost-effective installation in mind which can be adapted to the differing designs and property types in the UK. This is particularly beneficial for installers, allowing a wide variety of customers to benefit from this highly efficient renewable energy source.

The refrigerant circuit must be connected by a suitably qualified refrigerant engineer in conjunction with the installation manual supplied with the unit.

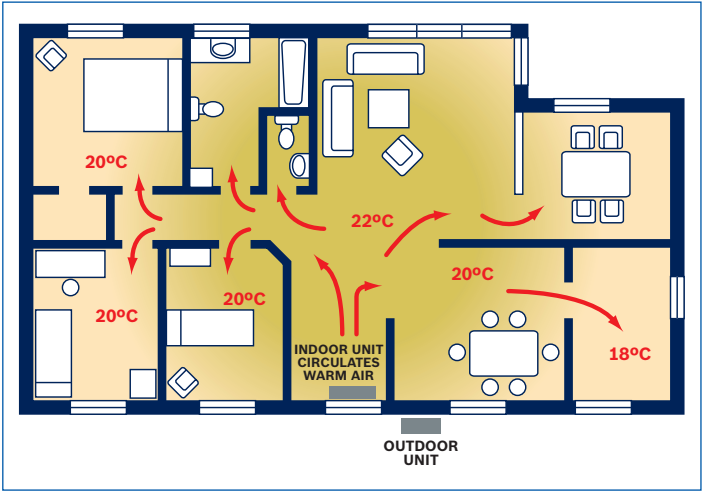


How a Greensource air to air heat pump distributes heat

An air to air heat pump utilises the latent thermal energy contained in the air surrounding a building. By reversing the same principle that a refrigerator uses to cool, an air to air heat pump can efficiently create warm air.

The heat drawn in from the outside air is passed from the external unit to the internal unit and, via the modulating fan, is circulated around the property.

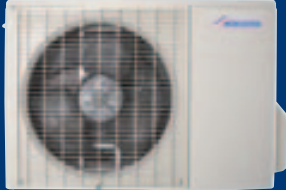
This air, and the heat that it carries, can be distributed around the property with adjacent rooms receiving a very similar temperature to the room in which the unit is installed in. Indeed, there is only a 2°C drop in temperature for each room that the heat dissipates through.




Heat is distributed evenly through the property

The Greensource air to air heat pump at a glance

Greensource air to air heat pump outdoor unit

	Greensource air to air heat pump outdoor unit
Kit part no.	7 716 150 179
Dimensions (w x h x d)	780 x 540 x 265mm
Weight	39kg
Min./max. emitted heat output	4.0kW
Min./max. emitted cooling effect	3.5kW
Airflow	30.2m³/min
Sound level cooling	47dB(A)
System refrigerant R410A	0.99kg
Digitally controlled rotary hermetically sealed compressor	Digitally controlled
Single phase voltage	220-240V
Maximum operating current	8.7A

Greensource air to air heat pump indoor unit

	Greensource air to air heat pump indoor unit
Kit part no.	7 716 150 179
Dimensions (w x h x d)	860 x 292 x 205mm
Weight	9kg
Min./max. emitted heat output	0.9/6.0kW
Min./max. emitted cooling effect	0.9/4.0kW
Airflow – cooling	6.9 - 10.6m³/min
Sound level low fan speed cooling	28dB(A)
Single phase voltage	220-240V
Outdoor rating	IPX4
Maximum operating current	8.7A
CoP (EN 14511)	4.5

Product info	
Part number	7 716 150 179

Features of the Greensource air to air heat pump



Applications

The Greensource air to air heat pump offers a wide range of fitting options and, due to the compact size of the outdoor unit, it only requires a suitable outside wall or solid base to be installed. The Greensource air to air heat pump is sufficient for heating an area of up to 100m², providing the property is well insulated. This makes it attractive for:

- Small properties – apartments, conservatories
- Offices
- Factory units
- Churches and community buildings
- Sports halls
- Doctors' surgeries and dental practices.

Green Deal

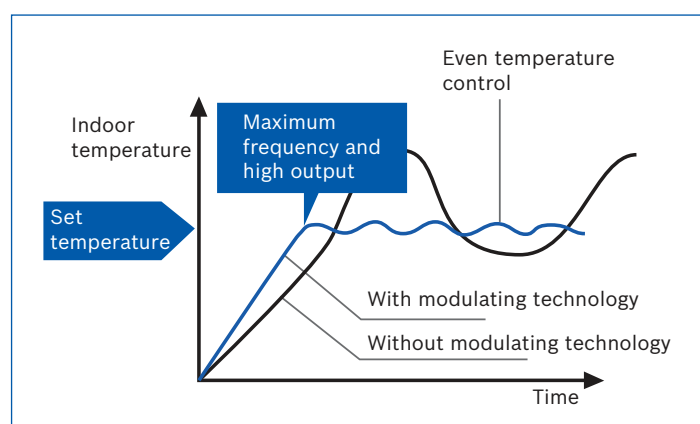
All Worcester Greensource heat pumps are eligible for the Green Deal incentive, providing that the installer is an authorised Green Deal installer. For more information about the scheme you can visit www.decc.gov.uk/greendeal

High efficiency in all temperature ranges

- Energy efficient throughout the year – SCOP of 3.8
- Future-proof – already meets proposed 2014 EU efficiency targets for heating and cooling operation
- Maximum heating output of up to 6kW, which is sufficient for heating an area up to 100m²
- Modulating fan saves 30-40% compared with a fixed speed unit

Modulating technology and auto de-icing

The Worcester air to air outdoor unit uses the latest inverter technology, which automatically modulates the compressor output according to user demand. This provides higher efficiency, lower running costs and a longer lifespan. Further efficiency gains are achieved via the automatic de-icing of the drain pan by recycling the latent heat from the refrigerant circuit. This innovative feature, which removes the need for electrical de-icing, further reduces the electrical consumption of the unit.



Inverter technology gives greater comfort and efficiency

Efficient energy saving chill protection

With the touch of a button, the air to air unit can protect your home from freezing temperatures. The built-in 10°C function ensures that a safe temperature is maintained, whilst avoiding any unnecessary energy consumption.

Improved high efficiency blades

The Worcester Greensource external air to air unit features the latest in blade technology. The new and improved tri-blade design delivers an increased airflow and allows more latent heat to be absorbed, raising the efficiency of the unit, whilst also reducing the energy consumption of the system.

Local Authority cost control – optional heating only mode

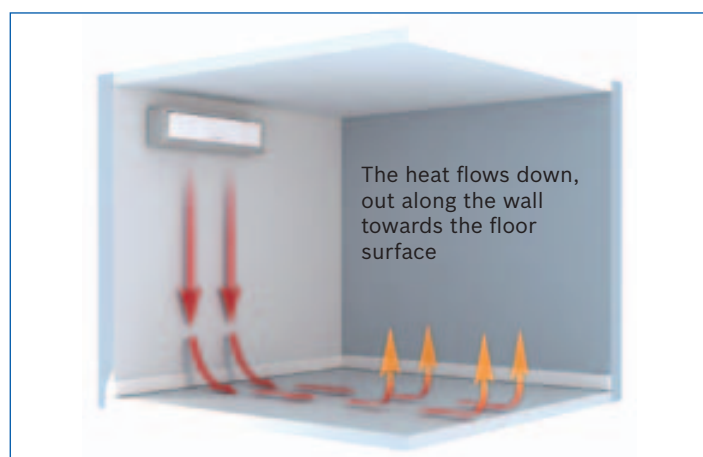
Based on customer feedback, the air to air unit now features a manual cooling cut-out. This has been principally developed for Local Authorities who want to maximize efficiency in heating mode in their housing stock.

Heating and cooling comfort

The Worcester Greensource air to air unit has consumer comfort at the heart of its design. In both heating and cooling modes the wide range of features and options will ensure you can tailor your customer's unit to give them the optimum environment to enjoy.

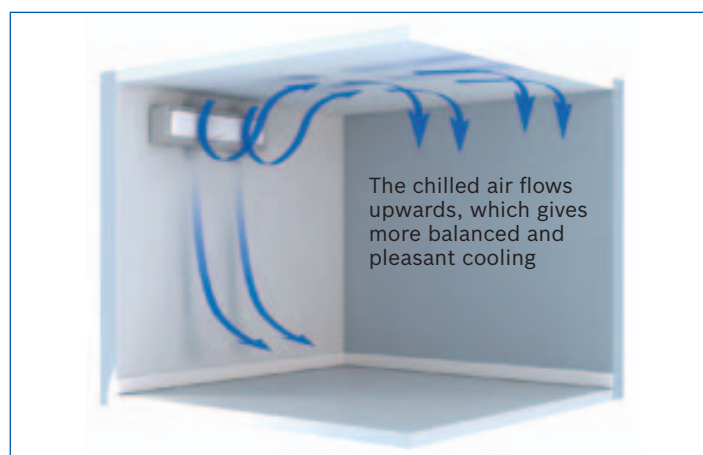
Integrated Coanda airflow effect

With the press of a button, the unit will deliver a 'Coanda' airflow which will optimally heat or cool the room. In heating mode, the indoor unit will channel hot air directly down the wall onto the floor surface. This will provide not only a warm and comfortable floor, but it will also ensure that the heat is evenly distributed throughout the room, ultimately achieving the same effect as underfloor heating.



'Coanda' warm air distribution in heating mode to prevent draughts

In cooling mode, the cool air is directed upwards which ensures a more pleasant and uniform temperature as the cool air filters evenly down through the room, preventing draughts and cold spots from occurring.



Cool air distribution in cooling mode

Highly effective air purification

The Worcester Greensource air to air heat pump uses Plasmacluster Ion Technology to offer excellent air quality within your customer's property. For further information see page 8.

Maximum control

The Greensource air to air heat pump is controlled by a simple remote control unit which has a multi-function menu. This menu allows you to control the operation, air quality, airflow and functions such as the airflow and Plasmacluster ion technology from any point within the room. For operating functions see page 18.



Key benefits for the customer

- Can be used to provide cooling air in the summer
- Active Ion Technology air purification is ideal for allergy sufferers
- Automatic internal defrost – reliable supply in freezing conditions
- Can provide hot air comfort even at -20°C
- Inverter technology saves money on electricity bills
- Optimum start feature for added heating comfort
- Twin rotary compressor reduces noise/vibration
- No hydraulic connection – ideal back-up solution
- Two years' parts and labour guarantee*
- Environmentally friendly – non-ozone depleting
- Four way air louvre distribution – optimum comfort.

Key benefits for the installer

- Refrigerant is pre-filled
- Depending on installation can be commissioned in one morning
- Key components are pre-installed
- Compact design – requires only an outside wall
- Suitable for a wide variety of property types, including apartments, conservatories, small industrial units, doctors' surgeries and dental practices
- Easy to install and maintain
- Bosch quality and reliability.

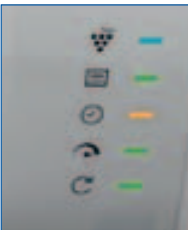
Plasmacluster Ion Technology – highly effective air purification



Active air purification creates positive and negative ions which breakdown air pollutants

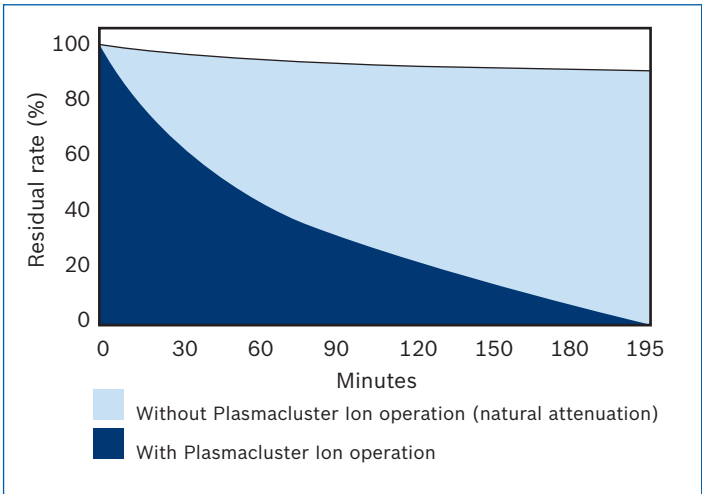
The Greensource air to air unit offers a lot more than standard air filtering for the homeowner. By utilising Plasmacluster Ion Technology, the indoor unit will actively clean and purify the air within the property. This is achieved by sending out Plasmacluster Ions into the air which attach to dirt and impurities, breaking them down into harmless substances. This includes unwanted particles such as dust and cigarette smoke. The Plasmacluster ions also reduce airborne viruses, bacteria and allergens as well as removing any unpleasant odours.

The graphs opposite highlight how the Greensource air to air heat pump effectively purifies the air in the area in which it operates. Plasmacluster Ion Technology offers the user many health benefits, including the removal of all airborne moulds within only three hours of operation and the elimination of 99% of airborne bacteria within just 38 minutes. These characteristics make the Greensource air to air heat pump ideally suited not only for the homeowner, but also for waiting rooms in doctors’ surgeries, dentists and vets. It can provide a highly effective solution where airborne mould and bacteria can pose particular issues.

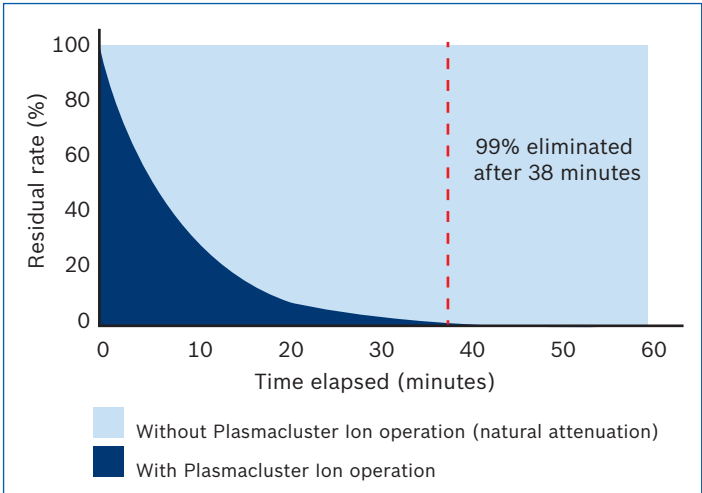


For the best air quality we recommend that the Plasmacluster Ion button is pressed and left on. The blue light will be visible.

Greensource air to air heat pump indoor unit control panel



Suppression of airborne mould



Surviving airborne bacteria

Assessing the efficiency of an air to air heat pump

Heating performance

The heating performance and efficiency of an air source heat pump system is commonly measured by the Coefficient of Performance (CoP). The CoP is a simple calculation which works out how much energy the heat pump is able to extract from the energy source compared to the amount of electrical energy it uses.

$$\text{CoP} = \frac{\text{Heat output of system (useful heat)}}{\text{Electrical input from compressor and fan motors}}$$

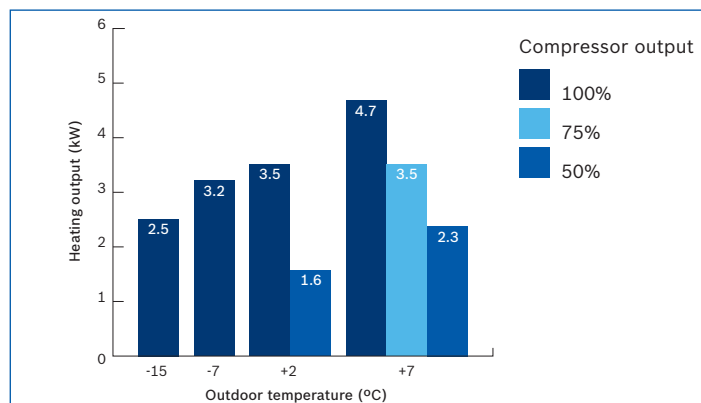
e.g. $\frac{6\text{kW heat pump}}{1.2\text{kW of electrical input}} = \text{CoP of } 5$

Generally speaking, the higher the CoP figure the greater the efficiency of the heat pump. A CoP however only applies to a specific temperature, which means that the CoP rating isn't representative of the performance that could be achieved across a whole year. A far more accurate assessment of efficiency therefore is provided by the SCOP (Seasonal Coefficient of Performance). It defines the performance of the heat pump over the course of the year, with seasonal variations in conditions. The Worcester Greensource air to air heat pump offers highly efficient heating in all seasons, with an industry leading SCOP of 3.8.

From 2013 all air to air heat pumps with an output of less than 12kW must display the SCOP performance and be awarded the EU energy label; something that the Worcester Greensource air to air heat pumps already achieve.

Heating output

As the graph below highlights, the heating output of the Greensource heat pump is high in a range of temperatures, with the unit supplying 2.5kW of heating comfort, even when the air outside is -15°C.

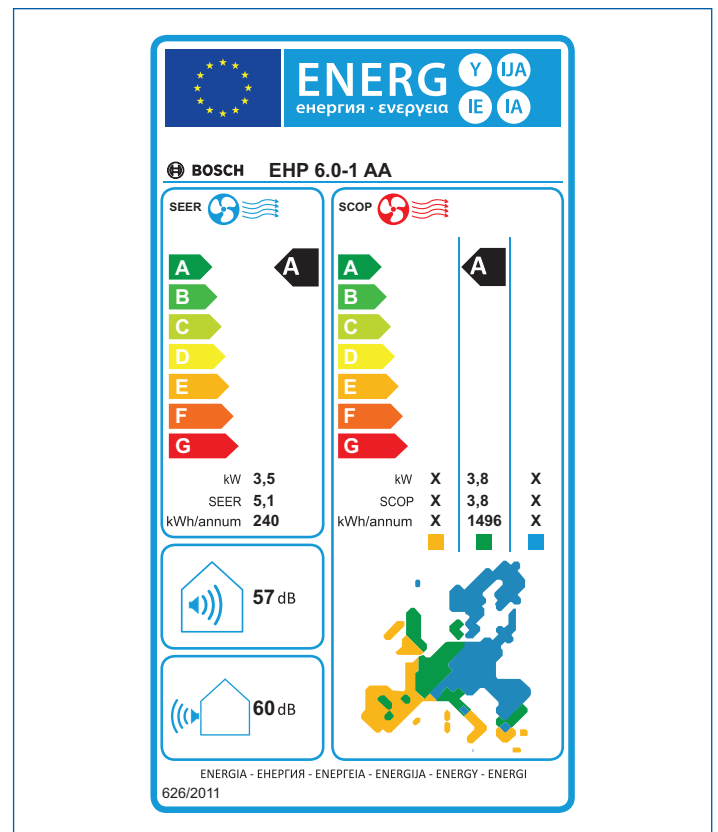


Emitted heating output

Cooling performance

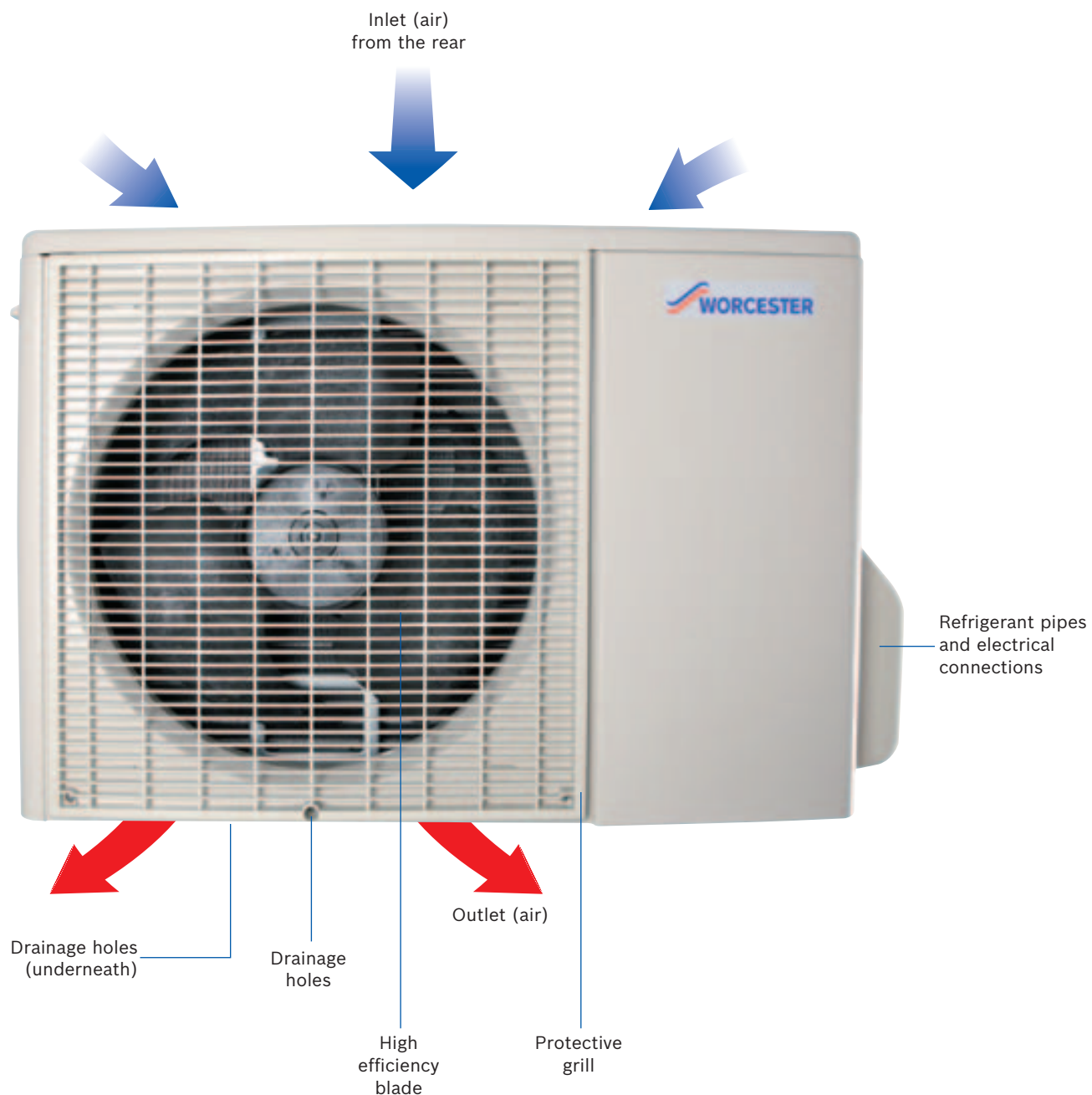
The Energy Efficiency Ratio (EER) of a particular cooling device, is the ratio of output cooling to input electrical power, at a given operating point. However, like the CoP, the EER is not representative of the varying conditions that the unit will operate in.

The Seasonal Energy Efficiency Ratio (SEER) evaluates the performance of the heat pump's cooling output against the energy consumed in a typical year's weather. The SEER is thus calculated with the same indoor temperature, but over a range of outside temperatures, giving a better benchmark of energy efficiency. This is displayed with the SCOP on the EU energy label that is awarded to the unit.

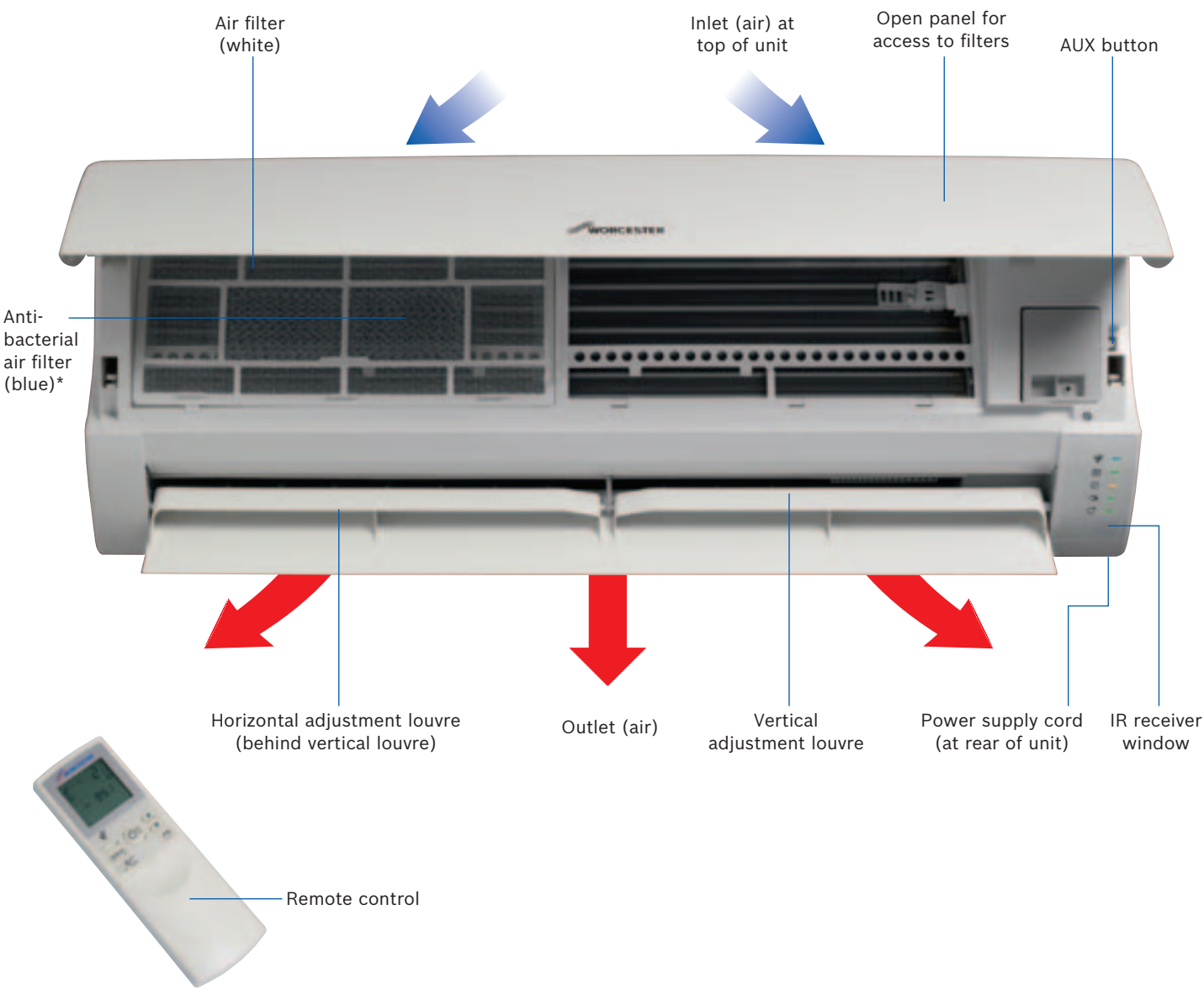


EU Energy label

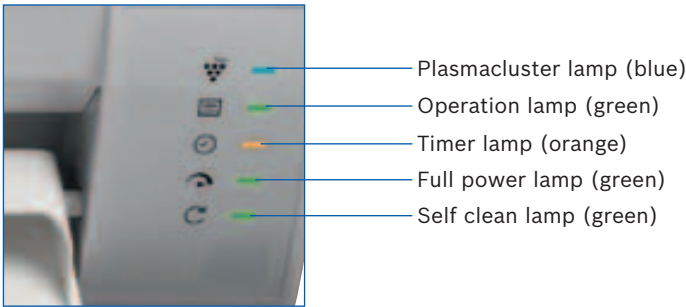
Inside story – Greensource air to air heat pump outdoor unit



Inside story – Greensource air to air heat pump indoor unit



***Anti-bacterial filters are not included with indoor unit. They are available as an accessory. Part No. 8 718 310 612.**



Greensource air to air heat pump indoor unit control panel

Technical data

		Greensource air to air heat pump
Dimensions (w x h x d)	indoor unit	860 x 292 x 205mm
	outdoor unit	780 x 540 x 265mm
Weight (kg)	indoor unit	9kg
	outdoor unit	39kg
Capacity heating		6kW
Inverter capacity range		1,400 - 6,000kW
CoP*		4.6
SCOP		3.8
Power supply		220 - 240V 50Hz
Starting current		<5A
Indoor fuse size		10A
Refrigerant		R410A
Amount of refrigerant		0.99kg
Capacity cooling		4kW
Cooling EER		5.1
Energy rating		A
Indoor sound pressure level cooling		28dB(A)
Outdoor sound pressure level cooling		47dB(A)
Operating range	cooling	-10 - +43°C
	heating	-20 - +24°C
Digitally controlled rotary hermetically sealed compressor		Digitally controlled
Connection**	liquid side	1/4"
	gas side	3/8"
Drain pipe		18mm
Max. refrigerant pipe length		15m
Pre-charged length		10m
Max. difference in height		7m
For every extra metre thereafter add		20g refrigerant per m
Mode		Cool/heat/dry/fan/auto
Fan speed		High/med/low/auto

*CoP calculated using EN 14511

**Only refrigeration pipe must be used for connection

	Operational features
Full power operation	✓
Time	24 hour programmer
Clock	✓
Timer on	✓
Timer off	✓
Timer on/off	✓
1 hour timer	✓
Vertical swing	Auto
Horizontal swing	Auto
Dust filter	✓
Anti-bacterial air purifying filter	✓
Remote controller	✓
Plasmacluster ION	✓
10°C heating operation	✓
Auto restart	✓
Auto changeover	✓
Winter cool function	✓
Self-clean function	✓
Coanda airflow – heating/cooling	✓
Auto-sleep function	✓
Awakening function	✓
Auto defrost	✓
Hot gas defrost	✓

Is a heat pump suitable for the property?

It is essential that heat pump systems are designed to operate efficiently in order to meet the building's heating needs and the expectations of the customer. In order to achieve this, the following design activities must be completed prior to installation:-

- **Pre-design assessment**

Determine the suitability of a heat pump system for the building based on the customer's requirements, expectations and building type.

- **Detailed design**

Complete building heat loss calculations.

- **Specification**

Select a suitable heat pump and system components based on the detailed design.

Heat loss

The total heat loss of the house is calculated from the addition of fabric and ventilation heat losses. Fabric heat loss is the transmission of heat by conduction through the building structure, i.e. windows, walls, roof and floor. Ventilation heat loss is heated air escaping from the house and being replaced by cold air from the outside.

Calculating the heat loss of the house

It is advised to calculate the heat loss of the house to ensure correct sizing of the heat pump system. The heat loss is dependent on the construction of the house, room sizes, external and internal design temperatures and air change rates. The heat loss calculations should satisfy the requirements of BS EN 12831.

Estimating heat loss

Estimating the heat loss of the building is useful in determining the suitability of a heat pump system. However, assumptions based on floor area (e.g. 50 W/m² for new build etc.) and SAP (the Government's Standard Assessment Procedure) should not be used for the detailed design and specification stage. It should be noted that the heat loss for non-standard houses i.e. houses with large areas of glazing, high ceilings, log burners etc. or houses in exposed locations may deviate significantly from any rules of thumb.

In existing properties, boilers are often oversized and should therefore not be used to determine the actual heat requirements of the house.

However, estimates may be made on the basis of the existing energy consumption of the space to be heated.

This document does not cover all the necessary details to calculate the heat loss. The information given here is provided to remind the heating system designer and installer of the process and considerations.

Worcester design service

Worcester's design team offers design support across all of the Worcester, Bosch Group product range. The design team produces technical drawings and provides specification advice for a range of customers; all of our team are authorised SAP assessors and hold an IDHEE Domestic Heating Certificate. Worcester provides a range of indemnified design solutions in support of our core range of Greenstar gas- and oil-fired boilers, Greenfloor underfloor heating and a growing portfolio of renewable technologies – including Greenskies solar thermal panels as well as Greenstore ground source and Greensource air source heat pumps.



For more information on the suitability of heat pumps for your home visit **www.worcester-bosch.co.uk**

For information and guidance on planning permission for split air to water heat pumps visit **www.energysavingtrust.org.uk**

Installing a Greensource air to air heat pump

Siting of the outdoor unit

The outdoor unit can be either wall mounted or floor standing. If floor standing, it should be placed on a flat, solid base e.g. concrete slabs or a suitable stand. A minimum clearance of 200mm is required around the front of the unit to ensure that there is adequate airflow (ideally 2 million litres per hour) for the heat pump to operate at maximum performance. The outdoor connecting pipes should be suitably insulated with Class 'O' insulation to prevent freezing.

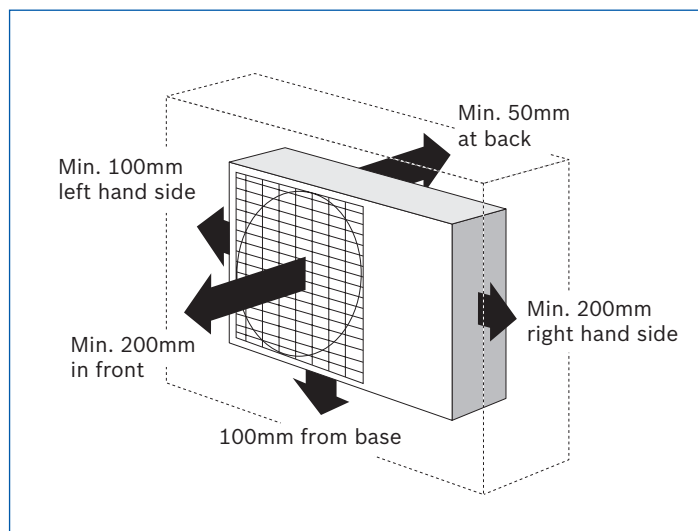
The heat pump can produce up to 20 litres of non-acidic condensation per day, depending on external temperatures. This should be diverted to a mains drain, a soakaway or rain water harvester. In order to prevent freezing the condensate pipe must be insulated with Class 'O' insulation and the drainage pipe must slope down towards a drain.

General siting advice

- If floor standing, the unit should be sited on a stable base or stand. Rubber matting can be used directly under the heat pump to act as a sound proofing material.
- Sufficient space should be provided around the unit for effective operation and ease of access for maintenance and cleaning.
- The unit should be sited where it will be sheltered from strong winds and rain. Locations where muddy water might be a problem (e.g. alongside a road) or where it could be tampered with should also be avoided.
- The air outlet must be kept free of any obstacles, or this could affect the performance and increase noise levels.
- Placing the unit where hot airflow or noise could be a nuisance to the property owner or neighbours should be avoided.
- The condensate water pipe must always be installed and suitably insulated.

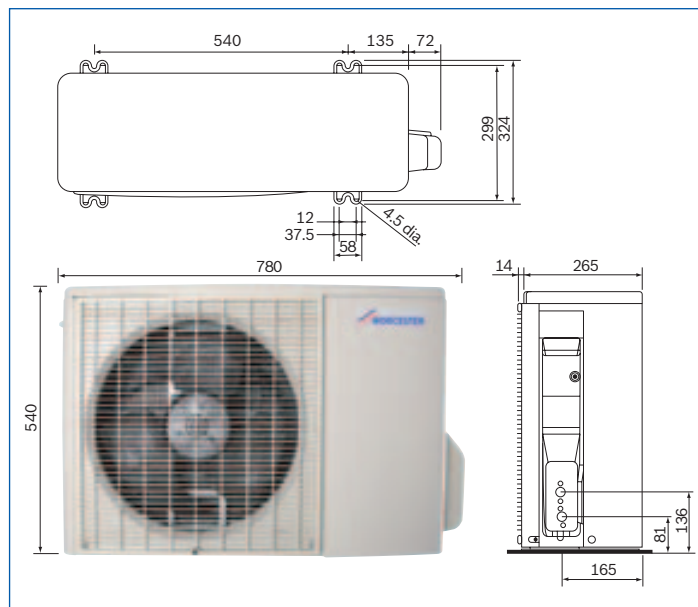
Outdoor unit installation clearances

Provide as much installation space as possible for efficient air movement. The following diagram highlights the minimum requirements.



Outdoor unit installation clearances

Outdoor unit casing dimensions



Outdoor unit casing dimensions

Siting of the indoor unit

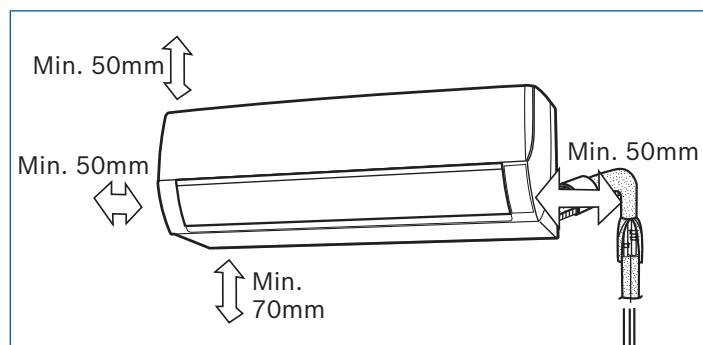
The most important factor when selecting the position for the indoor unit is to optimise the heat dispersion. It is important to keep the air outlet clear of any obstacle which might prevent air flowing smoothly into the entire room.

General siting advice

- Avoid placing the unit on a wall next to a bedroom.
- Avoid placing the unit in any room where the airflow or vibration could be a nuisance.
- Consider the best way of connecting the refrigerant pipes between the indoor and outdoor units. Going straight through the wall is the best option as it avoids running pipework inside the property.
- Make sure there is sufficient space around the unit and that the air filters can be easily removed for cleaning and replacement.
- Locate the unit and the remote control at least 1 metre from a TV set, radio or similar electrical appliance to avoid possible interference with the operation of the control unit.
- Avoid locating the remote control in a room which has electronic simultaneous-start or rapid-start fluorescent lighting which may affect its operation.
- Wiring of the units must be in line with the latest edition of the IEE Wiring Regulations (currently the 17th edition in force since 1st July 2008) also known as BS 7671:2008.

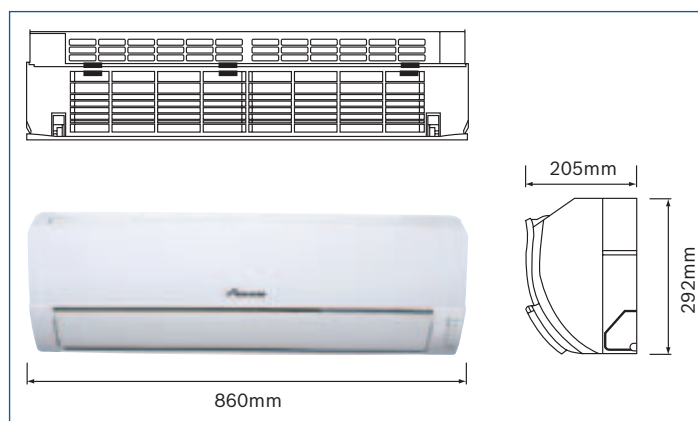
Indoor unit installation clearances

Provide as much installation space as possible for efficient operation of the units.



Indoor unit installation clearances

Indoor unit casing dimensions



Indoor unit casing dimensions

Pipework connections

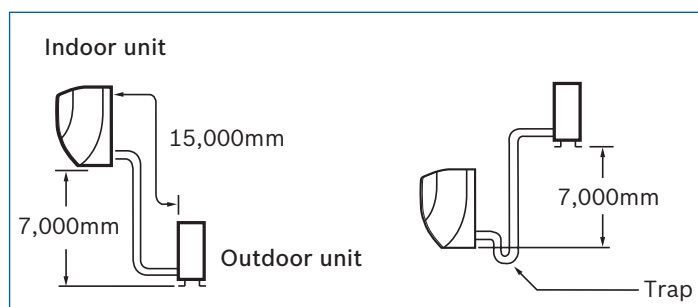
Piping length between the outdoor and indoor units should be 1m or more in order to decrease the vibration caused by the outdoor unit.

The unit comes pre-charged with enough refrigerant for a pipe length of up to 10m. If the piping length exceeds 10m, 20g of refrigerant per 1m should be added by a qualified refrigeration engineer up to a maximum of 15m.

Only refrigerant grade copper pipe suitable for refrigerant R410A should be used.

The condensate pipe outlet for the indoor unit should be 18mm diameter.

When the outdoor unit is placed at a higher level than the indoor units, a trap should be provided near the hose's lead-in port. The trap is required to help store lubrication oil for the compressor operation when the units are at different heights.



Maximum piping length



Installation of heat pumps should be in accordance with MCS MIS 3005, seek guidance from your local authority or the Energy Saving Trust – www.energysavingtrust.org.uk

Installing a Greensource air to air heat pump – a step by step guide



- A. To begin, it is important to find a **suitable site** to mount the Greensource outdoor inverter unit. It is worth keeping in mind that the unit's location should be far enough away that outgoing air and operating noise does not disturb the homeowner or neighbours. If choosing a floor siting situation, the system requires a stable base and should be sheltered from rain water, strong winds and not be exposed to muddy water (e.g. along a road) or in a position where the unit can be tampered with. (Fig. 1)

A good tip to ensure a successful installation is to complete a log throughout the commissioning process; this will help remind you of all the steps that need to be completed.

- B. Once happy with the chosen site, **position the outdoor unit** according to the installation instructions. The Greensource air source heat pump can be mounted onto a wall or directly onto the floor. Please allow a minimum of 200mm clearance around the front of the appliance and provide as much installation space as possible for efficient air movement. (Fig. 2)

- C. Next, **install the external wall bracket**. Place the mounting plate horizontally on the wall allowing 50mm clearance on both sides and mark the location for the wall plugs and the tube hole. Then drill the 6.5mm diameter and 32mm depth holes and fit the wall plugs. (Figs. 3 and 4)

- D. **Secure the internal mounting plate** in seven places and check it is firm. Drill a 70mm diameter hole, to hold the electrical cables and refrigerant pipework, with a 5mm downward slant to the outside. Set the sleeve and the caps.

- E. **Connect the electrical cable to the indoor unit**. Open the panel by about 70° and remove, and retain the screw from the indoor unit. Connect the electrical cable ensuring the markings on the indoor unit's terminal board match those of the outdoor unit.

Be careful not to confuse the terminal connections as wrong cabling may damage the internal control circuit. Fix the cable with the cord holder and replace the retained screw.

- F. **Mount the indoor unit to the wall**. Pass the auxiliary pipe and the drain hose through the piping hole and hook the unit onto the mounting plate. Push the unit and apply the bottom hooking points to the mounting plate's support. Check it is fixed in place by gently pulling the bottom of the unit. (Fig. 5)



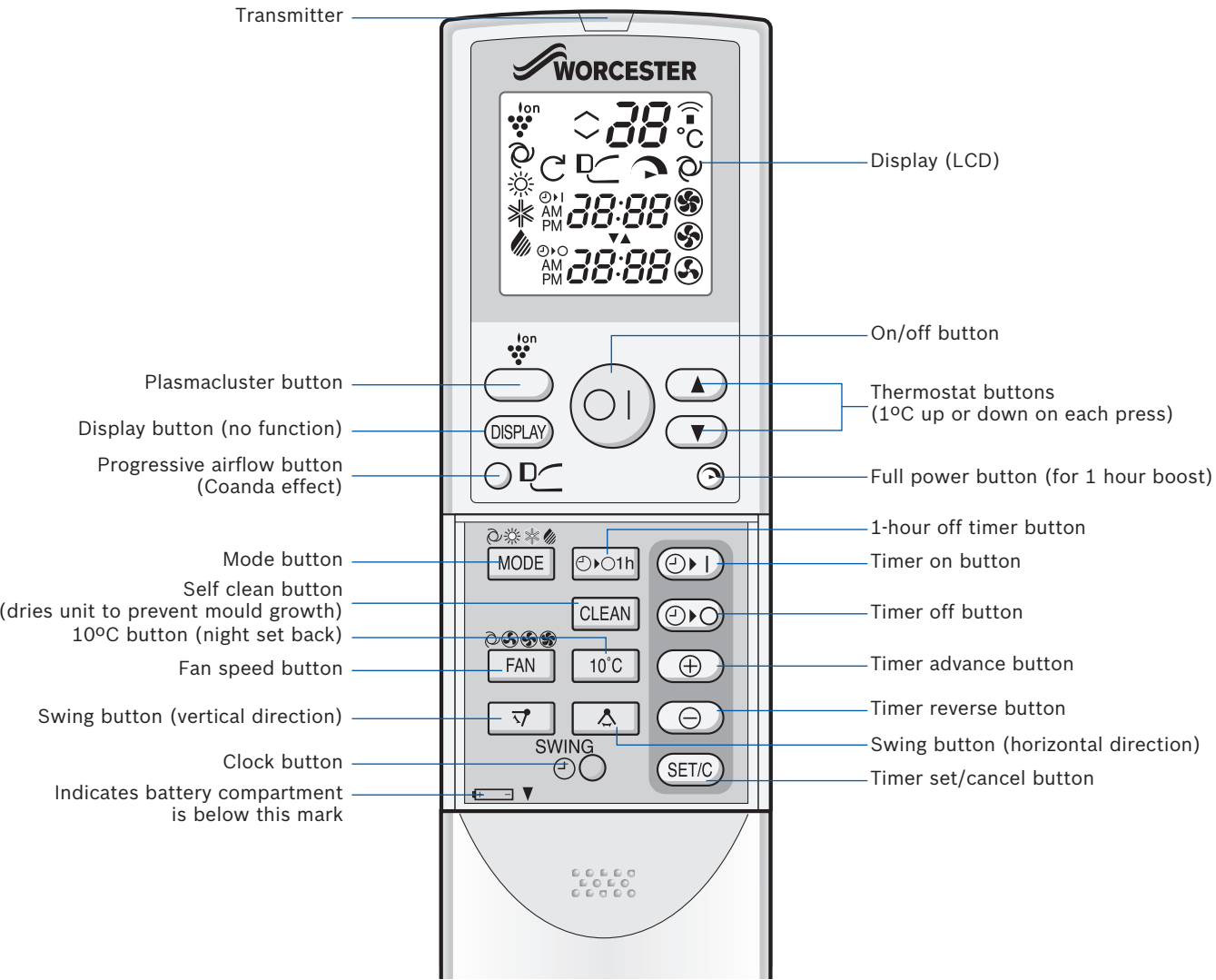
- G. **Connect the refrigerant and drain hose pipes***. Flare the end of the refrigerant pipe in order to connect. Lay the drain hose vertically to ensure a smooth drain flow with no traps. Tighten the pipes by hand for the first 3-4 turns and then use a wrench or torque spanner. Wind coating tape around the refrigerant pipes together with the drain hose and the electrical cable. (Fig. 6)
- H. **Insulate the refrigerant pipes and drain hose**. The thermal insulation should cover both the gas and liquid pipes, using Class 'O' insulation (6mm or thicker).
- I. **Connect the refrigerant pipes and the electrical cable to the outdoor unit**. Prepare the end of the electrical cable and remove the control box cover. Remove the cable holder and connect the cable, ensuring the terminal connections are as specified. Take care to dress the cable so that the control box cover, the cord holder and cable holder are not loose to avoid any potential problems. Fix the electrical cable sheath with the cable holder and the screw. Place the control box cover back in the reverse order. (Figs. 7 and 8)
- J. **Prepare a dedicated power supply circuit**. The appliance should be installed in accordance with national wiring regulations. Provide an earth leakage circuit breaker and fit a disconnection switch, having a contact separation of at least 3mm in all poles to the electricity power line.
- K. Complete the installation by doing a **test run**. Open the panel to view the control section, then start the operation with the remote control and press 'AUX' for five seconds or more. You should hear a beep sound and the 'operation' lamp will start to flash, indicating that the system is in the cooling test run mode. To test the heating mode simply select 'heating mode' on the remote control.

At Worcester we provide thorough training and a detailed commissioning check-list which ensures that everything is checked during the commissioning process. All Worcester trained installers give every customer a detailed handover explaining how the air source heat pump works. This ensures the customer is happy with their air source heat pump and understands fully how to operate it.

**It is a legal requirement for the connection of the refrigerant circuit to be carried out by a suitably qualified refrigeration engineer. The relevant Health and Safety procedures must be adhered to during installation.*

Operating your Greensource air to air heat pump

The Greensource air to air heat pump is controlled by a remote control unit which has a multi-function menu. The diagram below and the page opposite highlight the wide range of functions and settings that can be achieved.




























Mode button functions

Auto	
Heating	
Cooling	
De-humidifier	

Fan speed button functions

Auto	
High	
Low	
Soft	

Operating functions		
Operation		
	Inverter controlled operation	Quick cooling and heating operation, decreases fluctuation in temperature and reduces power consumption
	Full power mode	Heat pump works at maximum power to rapidly cool or heat the room
	Turbo operation	Heat pump fan works at “extra-high” fan speed with a setting temperature of 15°C in COOL & DRY and 32°C in HEAT mode to rapidly cool or heat the room
	Lower room temperature setting (from 18°C)	In cooling operation, room temperature can be set from 18°C
	Computerised dry mode operation*	Indoor fan motor and compressor are controlled by the microcomputer to maintain room humidity without dropping room temperature
	Auto operation mode*	In the AUTO changeover mode, the temperature setting and mode are automatically selected according to room temperature
	Auto & 3-step fan speed settings	Auto fan speed and 3-step (HIGH/LOW/SOFT) manual fan speed are available
	Auto restart function	When power failure occurs and after power recovery, unit will automatically restart in same setting which was active before power failure
	Auto changeover*	During AUTO mode operation, the mode will automatically switch between HEAT and COOL mode to maintain a comfortable room temperature
	Winter cool function	Cooling operation is available during winter season down to -10°C outside temperature
Air quality		
	Plasmacluster ion	Plasmacluster ion generator inside indoor unit releases positive and negative Plasmacluster ions into room and reduces airborne mould and viruses
	Anti-bacterial air purifying filter	Replaceable filter
	Anti-mould, detachable and washable air filter	Easily removed and cleaned by vacuuming
Airflow		
	Wide airflow	Provides much wider airflows to deliver Plasmacluster ions and cold or warm air to every corner of room
	Coanda airflow system	Provides warm air travelling down the wall to the floor during heating operation and cold air travelling up the ceiling during cooling operation to avoid direct airflow
	4-way auto air swing	Automatic vertical and horizontal airflow is available in order to make room uniformly cool or warm
	Auto swing louvre	Automatic vertical airflow is available in order to make the room uniformly cool or warm
Control convenience		
	Microcomputer control	Reliable and efficient operation
	LCD wireless remote control	Control convenience from any part of the room
	24 hour ON/OFF programmable timer	The start or stop operation (hour and minute) can be set at the same time
	1 hour OFF timer	When the ONE-HOUR OFF TIMER is set, the unit will automatically turn off after one hour
	“Awakening” function	When the ON timer is set, the unit will turn on prior to the set time to allow the room to reach the desired temperature by the programmed time
	“Auto sleep” function	When the OFF timer is set, the temperature setting is automatically adjusted to prevent the room from becoming excessively hot or cold while you sleep
Additional features		
	Quiet operation	Only 28dB(A) in soft fan speed mode
	Self cleaning function	Reduces growth of mould fungus, and dries the inside of the air conditioner unit with Plasmacluster ions used in cooling mode

*These modes do not give the best efficiency and savings, it is recommended either cooling or heating mode is used for optimum performance.

Installation requirements

System design requirements

The siting of the indoor unit should consider the free air movement and it should be noted that doors and walls restrict air movement when using an air to air heat pump for larger applications.

Connecting the outdoor and indoor units

The refrigerant circuit must be connected by a suitably qualified refrigerant engineer in conjunction with the installation manual supplied with the unit.

The electrical connections must be made by a qualified electrician using the latest IEE wiring regulations and the installation manual.

Only refrigerant grade copper pipe suitable for refrigerant R410A should be used. BS EN 12735-1: 2001 copper and copper alloys. Seamless, round copper tubes for air conditioning and refrigeration.

System care

An air to air heat pump does not require annual servicing but it is advisable to follow a few simple maintenance procedures.

The outdoor unit should be checked regularly for leaves and debris, especially on the evaporation fins and water tray. The outdoor unit should be cleaned using a watering can with a rose attached. If the unit needs to be cleaned, a car wash and polish can be used.

The indoor unit should be cleaned in accordance with the installation and user manual. For optimum performance the air filters should be removed and vacuumed each week.



Refrigerants

The Worcester Greensource air to air heat pump system uses R410A, a non-ozone depleting pre-charged refrigerant.

Spare parts

Only genuine Worcester, Bosch Group spare parts can be used with these products.

Standards

The installation of the Worcester Greensource air to air heat pump system must be carried out in accordance with the relevant requirements for safety, current Wiring Regulations, local Building Regulations, Building Standards (Scotland), (Consolidation) regulations and Bylaws of the local water company and Health and Safety document No. 63S (Electricity at Work Regulations 1989). It should be in accordance with the relevant recommendations of the following, British Standards and Regulations.

MCS MIS 3005

BS EN 255 – replaced by BS EN 14511

BS EN 378

Refrigerating systems and heat pumps. Safety and environmental requirements.

The Health and Safety at Work Act 1974

The Management of Health and Safety at Work Regulations 1999

The Construction (Health, Safety and Welfare) Regulations 1996

The Construction (Design and Management) Regulations 1994

The Lifting Operations and Lifting Equipment Regulations 1998, and any other relevant regulations in force at this time.

The manufacturer's notes must not be taken in any way as overriding statutory regulations.

Installation accessories

A number of accessories are generally available for use in the installation of a Greensource air to air heat pump. These are wall brackets, condensing unit drip trays and outdoor unit guards.



Wall bracket and condensing unit drip tray



Outdoor unit guard

Anti-bacterial filter accessory

Anti-bacterial filters are not included with indoor unit.

They are available as an accessory.

Part No. 8 718 310 612.



The following companies have nationwide coverage and are able to supply all the necessary refrigerant fittings and accessories for the installation of our Greensource air to air heat pump.

Heronhill Air Conditioning Ltd

Tel: 01823 665 660

www.heronhill.co.uk

Wolseley Climate Centre

Tel: 01282 834 498

www.wolseley.co.uk

Dean and Wood

Tel: 0113 201 2851

www.dean-wood.co.uk

United Refrigeration

Tel: 01455 630 770

www.uriukltd.com

HRP

Tel: 01359 270 888

www.hrponline.co.uk

Frequently asked questions

Where can a Greensource air to air heat pump be used?

Due to its compact size and ease of installation a Greensource air to air heat pump is suitable for installation for a wide range of domestic and commercial properties.

The outdoor unit requires very little space if floor standing and it's suitable for wall mounting which increases the siting options further.

What refrigerant is used in Greensource air to air heat pumps?

Greensource air to air heat pumps use R410A. It is an approved refrigerant featuring zero ozone depleting potential. It also has a low global warming potential which is more environmentally friendly.

What is the lower limit operating temperature?

The lower limit operating temperature of the outdoor Greensource air to air heat pumps is -20°C.

What are the key maintenance requirements for a Greensource air to air heat pump?

An air to air heat pump does not require annual servicing but it is advisable to follow a few simple maintenance procedures.

The outdoor unit should be checked regularly for leaves and debris, especially on the evaporation fins and water tray. The outdoor unit should be cleaned using a watering can with a rose attached. If the unit needs to be cleaned a car wash and polish can be used.

For optimum performance the air filters in the indoor unit should be removed and vacuumed each week.

How should the unit be sited to ensure sufficient airflow and access?

It is important to ensure there is sufficient space for airflow into the unit and enough clearance at the front of the heat pump to stop cold air re-circulation. You also need to ensure that there is adequate access space for service and maintenance. You should try to ensure that the unit is sheltered from high winds and rain as this will improve the unit's efficiency level by lowering the fan power requirement. The minimum clearances required are shown on page 14.

What size of cable should be used to connect the air to air heat pump to the mains electricity supply?

Consideration should be given to the size of the unit, the length of the cable run and the type of cable being used. Only have installation work carried out by qualified technicians who will be able to calculate the correct cable size for each installation. Wiring of the units must be in line with the latest edition of the IEE Wiring Regulations (currently the 17th edition in force since 1st July 2008) also known as BS 7671:2008.

Can the external air to air heat pump unit be hidden behind bushes, trees and fences?

Yes, but you have to be aware that wherever you position the unit it has to have adequate airflow available to it and that the discharge air can't be re-circulated back to the inlet. If you don't take enough care in this respect, it will result in lowering the air temperature and can significantly reduce the efficiency of the unit. Our recommended clearances should be noted on page 14.

Can an air to air heat pump be used to cool the home as well as providing heat?

A Greensource air to air heat pump can cool a property as well as heating it. It also has the added advantage of acting as an air purifier and dehumidifier.

What guarantee is available?

Greensource air to air heat pumps come with a 2 year* manufacturer's guarantee provided that the guarantee is registered within 30 days of installation. For more information please call 0844 892 2552.

Is there a training course available?

Yes, Worcester offers a range of training courses including a 1 day Greensource air to air training course. Please call 01905 752526 for more information.

Note: Only one indoor unit and one outdoor unit can be used together as a single split system.

The very best training programmes from Worcester

Worcester has always placed great emphasis on technical support and training for installers and service engineers. Advances in heating technology, including the increasing use of renewables, make the need for training greater than ever.

To ensure the highest levels of competence and expertise in the installation of all Worcester products, we run intensive training courses for installers, commissioning engineers and operatives involved with servicing and fault finding.

Courses available

Our training facilities offer a number of courses suitable for the installer and commissioning engineers, and more in-depth courses for the servicing and fault finding engineers.

Training centres throughout the UK

To enable us to meet the growing demand for training we have invested in additional facilities at the award-winning training academy at our Worcester headquarters. In addition to the original academy there is now a new 400m² unit, 25% of which is devoted to an open-plan domestic training area with life-size single-storey brick buildings. These feature working Greenskies solar thermal systems which enable installers to get up onto the roof of the building to get more realistic training. There are bays full of all Greenstar gas-fired appliances, so installers can really get to grips with the importance of system design. The additional space also contains dedicated training areas for our renewable and future products. The training centre also runs certified domestic and commercial ACS training and assessment.

Further academies are located at West Thurrock in Essex, Wakefield and Clay Cross in Derbyshire, all offering our full suite of courses. Please phone 01905 752526 for more information about a course near you. Each course is run by specialist trainers and is superbly equipped to deliver a combination of classroom theory and practical hands-on experience that's second to none.

College-linked Learning

As well as offering training at our own centres, Worcester has established close partnerships with many colleges around the UK, equipping them with our latest products. Call us on 01905 752526 to find out when we will be running the course of your choice at a college in your area.

Mobile training

To complement our training venues across the country, we can also bring training to you.

We have mobile vehicles fully equipped with operational Greenstar gas-fired boilers, dry strip-down models and even a Greensource air to air heat pump, ensuring that quality training in a comfortable environment can be achieved on your doorstep!

If it's oil training you require, our 7.5 tonne mobile oil vehicle is available throughout the country for hands-on product training and OFTEC assessments.

Distance learning/web based learning

Worcester has produced a selection of Distance Learning CD ROMs/DVDs which are packed with information. Call 0844 892 9800 for your copies, or visit **www.worcester-bosch.co.uk** for information on Web Based Learning.

Get on course for a more profitable future now.



Call now for more information 01905 752526

Heat pump and accessory product courses

All academies allow customers to gain hands-on experience with our entire range of renewable products and inform installers about the true benefits of installing heat pumps and underfloor heating. The introduction to heat pumps course is designed for installers and heating engineers who have no experience in installing heat pumps. The various one day heat pump courses are designed for those with more practical experience in heat pump technology.

Renewable courses

Introduction to heat pumps.

Greenstore LECP ground source heat pumps.

Greenstore split air to water heat pumps.

Greenstore air to water heat pumps.

Greenstore air to air heat pumps.

Greenstar Plus Hybrid heat pumps.

Renewable range overview.



	Intro to heat pumps	GSHP	Split AW	AWHP	AAHP	Hybrid	Renewable Overview
Duration	1 Day	1 Day	1 Day	1 Day	1 Day	1 Day	1 Day
Cost	£65	£65	£65	£65	£65	£65	£65
Training course covers							
Specification	✓	✓	✓	✓	✓	✓	✓
Installation	✓	✓	✓	✓	✓	✓	—
Commissioning	✓	✓	✓	✓	✓	✓	—
Servicing	✓	✓	✓	✓	✓	✓	—
Maintenance	✓	✓	✓	✓	✓	✓	—
Product overview	✓	✓	✓	✓	✓	✓	✓
System design	✓	✓	✓	✓	✓	✓	—
Course locations							
Worcester	✓	✓	✓	✓	✓	✓	✓
Clay Cross	✓	✓	✓	✓	✓	✓	✓
Wakefield	✓	✓	✓	✓	✓	✓	✓
West Thurrock	✓	✓	✓	✓	✓	✓	✓
College Links*	✓	✓	✓	✓	✓	✓	✓
Mobile*	—	—	—	—	✓	—	—

*Please contact Worcester Training for specific colleges and mobile dates

To complement the above courses, Worcester also runs a **Hot Water Systems and Safety course** and **IDHEE domestic heating design course**. For more information turn to page 25.

Please note: it is recommended that unless you have experience installing/commissioning/servicing heat pumps or have worked previously with heat pump technology, that the one day introduction to heat pumps course be attended before commencing with any specific heat pump product courses.



Additional product and industry training courses

The diversity of products in today's heating industry gives you the opportunity to expand your expertise, whilst offering more choice to your customers. Worcester provides comprehensive training from all its academies on its entire range of technologies.

We are here to provide you with training and assistance for all areas of your business, not just product training. Call us on **01905 752526** to order a full course training brochure or to book yourself onto a training course, alternatively, you can visit **www.worcester-bosch.co.uk/training**

Gas-fired condensing boiler courses

Greenstar CDi Classic gas-fired condensing combi boilers.

Greenstar CDi Compact gas-fired condensing combi boilers.

Greenstar Si & i Junior gas-fired condensing combi boilers.

Greenstar system & regular gas-fired condensing boilers (covers Greenstar Ri, Greenstar CDi Classic Regular, Greenstar FS CDi Regular, Greenstar 30CDi Classic System and Greenstar i System boilers).

Greenstar Highflow CDi & FS CDi regular floor standing gas-fired condensing combi and regular boilers.

Oil-fired product courses

Greenstar oil-fired products.

Oil advanced fault finding.

OFTEC 101, 105e and 600a.

Accessories training courses

Greenfloor heating.

Worcester controls.

Commercial product courses

Greenspring CWi47 water heater.

GB162 overview.

GB162 domestic.

GB162 commercial.

Greenstar Heat Distribution Unit.

Commercial ACS training and assessment – CODNCO1.

Industry focused courses

BPEC underfloor heating installation.

Hot water systems & safety.

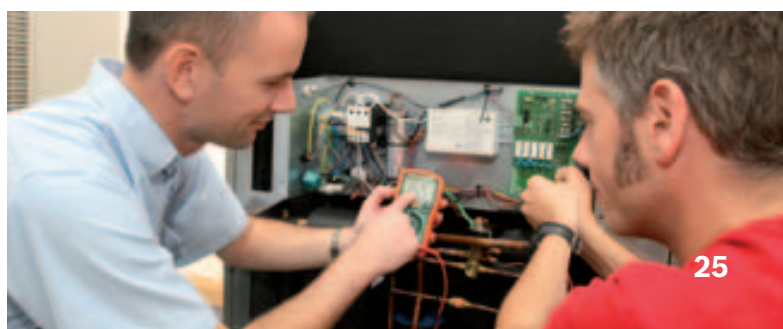
Chemical water treatment.

Construction skills F-Gas training/assessment certification.

IDHEE domestic heating design.

Domestic ACS training and assessment – reassessment. CCN1 + 3 appliances.

MCS Made Easy.



A complete after-sales service

As part of the worldwide Bosch Group, Worcester strives to maintain the highest possible standards of after-sales care.

In addition to the no-nonsense parts and labour guarantee applicable to all Worcester products, you and your customers have the assurance that every Worcester product is manufactured to both the appropriate British and European standards.

Worcester Contact Centre

Should you require support, our award winning Contact Centre team, based at our head office in Worcester, are ready to take your calls. Whatever your query our contact centre operators along with our nationwide team of engineers are ready to help you.

Tel: 0844 892 9900

Opening times

Monday – Friday: 7.00am – 8.00pm

Saturday: 8.00am – 5.00pm

Sunday: 9.00am – 12 noon

Bank Holidays: 8.00am – 4.30pm



All the technical advice you need

Spares

Genuine replacement parts for all supported Worcester products are readily available from stock, or on a next day delivery basis. Visit our website at **www.worcester-bosch.co.uk/spares** to find your local stockist.

Customer Technical Support

The Worcester Technical Helpline is a dedicated phone line – committed to providing a comprehensive service to complement the brand name and quality of our products. Our experienced team of technical experts provides answers to queries of a technical nature across the entire Worcester range.

Worcester also has a pre-sales department, which provides assistance in selecting a heating system to suit a particular application, along with full guidance on installation. For more information please contact the Technical Helpline or alternatively visit our website where literature can be downloaded at **www.worcester-bosch.co.uk**.

Technical

Tel: 0844 892 3366

Fax: 01905 752 741

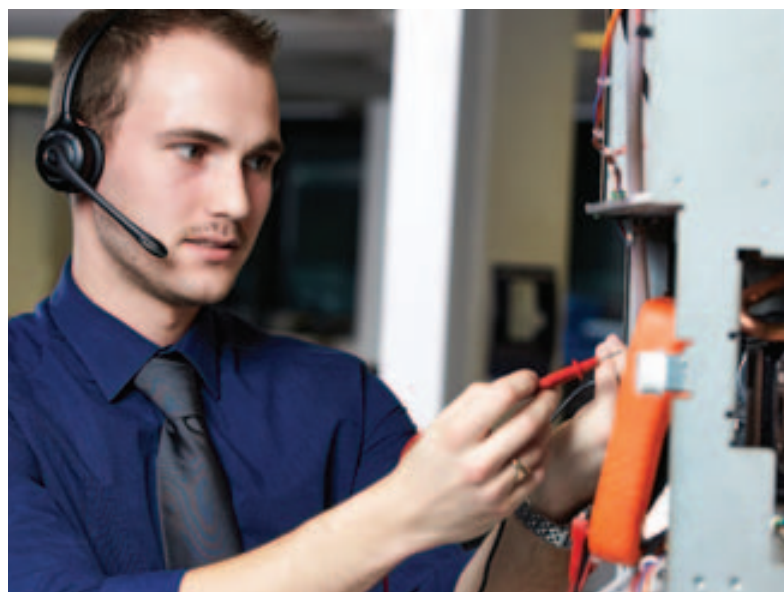
technical.enquiries@uk.bosch.com

Opening times

Monday – Friday: 7.00am – 8.00pm

Saturday: 8.30am – 4.00pm

Bank Holidays: 8.00am – 4.30pm



Useful numbers

Sales

Tel: 01905 752640
Fax: 01905 456445

Spare Parts

Tel: 01905 752576
Fax: 01905 754620

Technical Helpline (Pre & Post Sales)

Tel: 0844 892 3366
Fax: 01905 752741
technical.enquiries@uk.bosch.com

Renewables Technical Helpline

Email: renewable.energy@uk.bosch.com
or telephone 0844 892 4010

Training

Tel: 01905 752526
Fax: 01905 752535

Literature

Email: literature@uk.bosch.com
or download instantly from our website
or telephone 0844 892 9800

Calls to the listed 0844 numbers are charged at up to 3 pence per minute from BT land lines.
Calls from mobiles and some other networks may vary. Calls to and from Bosch Thermotechnology Ltd
may be recorded for training and quality assurance purposes.

Customer Service

Engineer Appointments

Email: appointment.worcester@uk.bosch.com
or telephone 0844 892 3000

Enquiries

Email: service.mailbox@uk.bosch.com
or telephone 0844 892 3000

Guarantee Registration

To register your Worcester guarantee,
please visit our website or
telephone 0844 892 2552

www.worcester-bosch.co.uk



Worcester, Bosch Group is a brand name of Bosch Thermotechnology Ltd.

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